

A Systematic Study on the Ant Subfamily Leptanillinae of China (Hymenoptera: Formicidae)

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Abstract: Two genera of the ant subfamily Leptanillinae are recorded in China. Three species including a new species of the genus *Leptanilla* Emery are reported: *L. hunanensis* Tang, Li et Chen from Hunan Province, *L. taiwanensis* Ogata, Terayama et Masuko from Taiwan Province, *L. yunnanensis* sp. nov. from Yunnan Province. *Protanilla* Taylor is newly recorded in China, of which 2 new species are described from Yunnan Province, i.e. *P. concolor* sp. nov. and *P. bicolor* sp. nov. Keys to the two genera of Leptanillinae and their species in China based on worker caste are provided

Key words: Hymenoptera; Formicidae; Leptanillinae; Systematics; China

The Leptanillinae are a small subfamily in the ant family Formicidae. Seven genera of the subfamily are recorded in the world, but 4 of them known only from male caste. The other 3 genera known from worker caste are *Leptanilla* Emery, *Protanilla* Taylor, and *Anomalomyrma* Taylor (Bolton, 1990, 1994, 1995).

Leptanilla Emery is distributed in the Old World tropics and temperate zones. Thirty-six species of the genus are known in the world (Bolton, 1995). Baroni Urbani had a revisionary study of the genus, in which workers of 17 species and males of 16 species were treated. Tang *et al.* (1992) reported the distribution of Leptanillinae in China for the first time and described a new species of the genus, *L. hunanensis*, from Hunan Province. But this species was not listed in the catalogue of Bolton (1995). Ogata *et al.* (1995) reported the second Chinese species of *Leptanilla*, *L. taiwanensis*, from Taiwan Province. In this study, a new species, *L. yunnanensis* sp. nov., is described from Yunnan Province.

Protanilla Taylor is distributed in Southern Palaearctic, Oriental and Indo-Australian regions (Bolton, 1994). Only one species of the genus, *P. rafflesi* Taylor, was recorded in the world (Bolton, 1990, 1995). *Protanilla* has been recorded in China for the first time

with the discovery of 2 new species from Yunnan Province in this study.

Standard measurements and indices are as defined in Holldobler *et al.* (1990) and Bolton (1994): TL-Total length, HL-Head length, HW-Head width, CI-Cephalic index = $HW \times 100/HL$, SL-Scape length, SI-Scape index = $SL \times 100/HW$, PW-Pronotal width, AL-Alitrunk length, PNL-Petiolar node length, PNW-Petiolar node width, PNH-Petiolar node height, PPNL-Postpetiolar node length, PPNW-Postpetiolar node width, PPNH-Postpetiolar node height. All measurements are expressed in mm.

The type specimens are deposited in The Insect Collections, Southwest Forestry College, Kunming, Yunnan Province, China.

Key to the genera of Leptanillinae of China based on worker caste (after Bolton, 1994)

Mandible with 3 ~ 5 teeth, all located on distal half of masticatory margin. Maxillary palp with 1 segment. Metanotal groove vestigial to absent. Bulla of metapleural gland rounded, located behind level of propodeal spiracle. Metapleural trench absent. Clypeus very narrow in front of antennal insertions, very close to the anterior margin of the head (Figs. 1 ~ 17) (Old World tropics and temperate zones) ...

..... *Leptanilla* Emery

Mandible with numerous peg-like teeth on inner surface. Maxillary palp with 4 segments. Metanotal groove present. Bulla of metapleural gland elongate and narrow, running longitudinally below the propodeal spiracle. Metapleural trench present. Clypeus relatively broad in front of antennal insertion, well back from the anterior margin of the head (Figs. 18 ~ 23) (Southern Palaearctic, Oriental and Indo-Australian regions) ***Protanilla* Taylor**

Key to the species of *Leptanilla* of China based on worker caste

- 1 Metanotal groove present (Figs. 1 ~ 2) (China: Hunan Province) ***L. hunanensis* Tang, Li et Chen**
- Metanotal groove absent 2
- 2 Anterior margin of clypeus incised in the middle. In profile view petiolar node roundly convex, in dorsal view the node as broad as long (Figs. 3 ~ 9) (China: Taiwan Province) ***L. taiwanensis* Ogata, Terayama et Masuki**
- Anterior margin of clypeus straight and complete. In profile view petiolar node rectangular, in dorsal view the node broader than long (Figs. 10 ~ 15) (China: Yunnan Province) ***L. yunnanensis* sp. nov.**

***Leptanilla yunnanensis* sp. nov.** (Figs. 10 ~ 15)

Holotype worker: TL 1.44, HL 0.30, HW 0.24, CI 80, SL 0.14, SI 58, PW 0.16, AL 0.36, PNL 0.08, PNW 0.11, PNH 0.12, PPNL 0.08, PPNW 0.13, PPNH 0.14. Head longer than broad, roughly rectangular, narrowed forward. In full-face view occipital margin shallowly emarginate, occipital corners roundly prominent. Lateral sides weakly convex, anterolateral corners rounded. Anterior margin of clypeus weakly convex and complete. Anterior portion of head convex between antennal sockets. Mandible with 3 teeth, the large apical tooth followed by 2 small teeth. Antenna 12-segmented, apex of scape reached to 1/2 of the distance from antennal socket to occipital corner, segments 3 ~ 11 broader than long. In profile view dorsum of alitrunk relatively straight, promesonotal suture distinct, metanotal groove absent. In profile view petiolar node roughly rectangular, anterodorsal and posterodorsal corners blunt and distinct, dorsum slightly convex. Sternite of petiole roughly triangular, bluntly angled in ventral direction. Postpetiolar node also rectangular and similar to petiolar node in profile view, sternite of postpetiole large and anteroventrally pointed, rounded at apex. In dorsal view petiolar node

roughly rectangular and broader than long, postpetiolar node broader than long and narrowed forward. Head, alitrunk, petiole, postpetiole and gaster smooth and shining. Head and body with sparse subdecumbent hairs and dense decumbent pubescence. Appendages with dense decumbent pubescence. Body in color orange yellow.

Paratype workers: TL 1.2 ~ 1.4, HL 0.28 ~ 0.30, HW 0.23 ~ 0.24, CI 79 ~ 86, SL 0.13 ~ 0.14, SI 57 ~ 58, PW 0.16, AL 0.34 ~ 0.36, PNL 0.07 ~ 0.08, PNW 0.11, PNH 0.11 ~ 0.13, PPNL 0.07 ~ 0.08, PPNW 0.12 ~ 0.13, PPNH 0.14 ~ 0.15 ($n = 5$). As holotype.

Paratype female: TL 2.3, HL 0.36, HW 0.31, CI 89, SL 0.14, SI 45, PW 0.23, AL 0.58, PNL 0.14, PNW 0.22, PNH 0.15 ($n = 1$). Similar to holotype worker, but body much larger. Occipital margin distinctly emarginate, anterior margin of clypeus straight. Three mandibular teeth located on the apical half of the masticatory margin. Pedicel with only 1 segment, petiolar node much broader than long in dorsal view. Gaster very large, unsegmented cerci present. Head and body with abundant subdecumbent hairs.

Holotype: worker, No. A97-2306, 1 600 m, Papo Village, Meng' a Town, Menghai County, Yunnan Province, from a colony constructing nest in soil in deciduous broad-leaf forest, 1997. IX. 9 (XU Zhenghui). Paratypes: 13 workers and 1 female, from the same colony as the holotype and with the same data.

This new species is close to *L. thai* Baroni Urbani (Figs. 16 ~ 17), but in dorsal view lateral sides of pronotum roundly convex, both petiolar node and postpetiolar node are transverse and broader than long; in profile view petiolar node roughly rectangular, sternite of petiole bluntly angled in ventral direction.

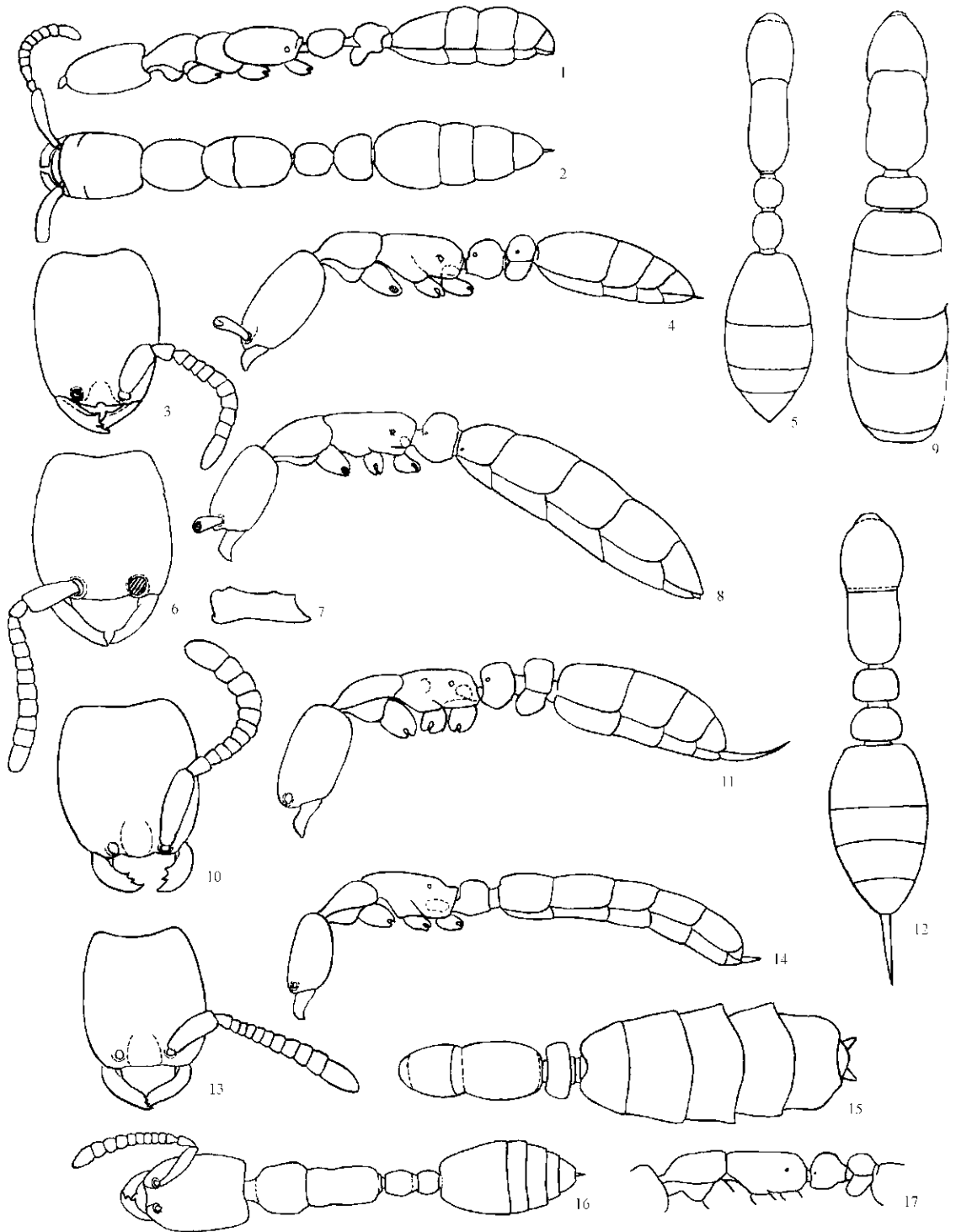
Biological notes: A colony of *L. yunnanensis* sp. nov. which constructs nest in the soil in deciduous broad-leaf forest was revealed. A female and 25 workers were observed in the nest.

***Protanilla* Taylor, new record in China**

Protanilla Taylor, in Bolton, 1990, *Syst. Ent.*, 15: 279.

Type-species: *Protanilla rafflesi* Taylor, by original designation.

Range: Oriental and Indo-Australian.

Figs. 1~17 *Leptanilla* workers and females图1~17 细蚁属 *Leptanilla* 工蚁和雌蚁

1~2: *L. hunanensis* Tang, Li et Chen (湖南细蚁); 3~9: *L. taiwanensis* Ogata, Terayama et Masuko (台湾细蚁); 10~15: *L. yunnanensis* sp. nov. (云南细蚁, 新种); 16~17: *L. thai* Baroni Urbani (泰国细蚁); 1~2, 3~5, 10~12, 16~17: Workers (工蚁); 6~9, 13~15: Females (雌蚁); 1, 4, 8, 11, 14, 17: Body in profile view (整体侧面观); 2, 5, 9, 12, 15, 16: Body in dorsal view (整体背面观); 3, 6, 10, 13: Head in full-face view (头部正面观); 7: Mandible in dorsal view (上颚背面观); 1~2: After Tang *et al.* (1992); 3~9: After Ogata *et al.* (1995); 16~17: After Baroni Urbani (1977); Pilosity omitted (毛被省略)

Key to the species of *Protanilla* of China based on worker caste

1 In full-face view head constricted at the antennal socket position. Mandible with 13 peg-like teeth. Anterior margin of clypeus straight. Antennal segments 4 ~ 10 as broad as long. In profile view anterodorsal corner of petiolar node higher than posterodorsal corner, sternite of postpetiolar node higher than long. In dorsal view both petiolar node and postpetiolar node are broader than long. Body in color reddish brown (Figs. 18 ~ 20) (China: Yunnan Province)

..... *P. concolor* sp. nov.

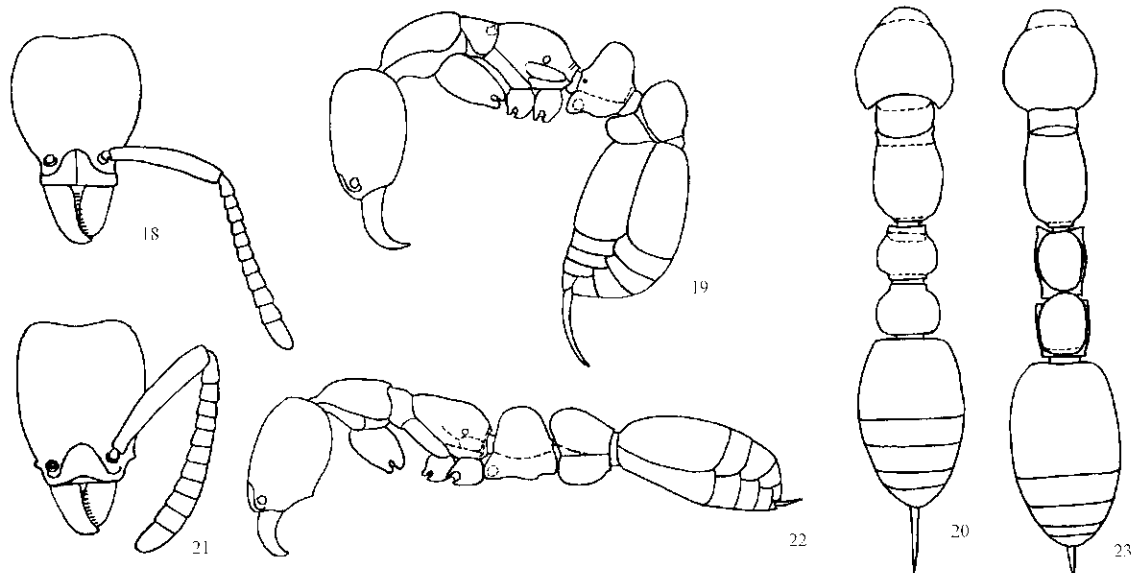
2 In full-face view head not constricted at the antennal socket position in contrary with a prominence. Mandible with 11 peg-like teeth. Anterior margin of clypeus emarginate. Antennal segments 4 ~ 10 broader than long. In profile view anterodorsal corner of petiolar node as high as posterodorsal corner, sternite of postpetiolar node longer than high. In dorsal view both petiolar node and postpetiolar node are longer than broad. Body in color brownish yellow, metathorax, propodeum, petiole, postpetiole and first gastral segment black (Figs. 21 ~ 23) (China: Yunnan Province)

..... *P. bicolor* sp. nov.

Protanilla concolor sp. nov. (Figs. 18 ~ 20)

Holotype worker: TL 2.9, HL 0.57, HW 0.47, CI 82, SL 0.47, SI 100, PW 0.38, AL 0.80, PNL 0.22, PNW 0.23, PNH 0.33, PPNL 0.20, PPNW 0.26, PPNH 0.34. Head longer than broad, narrowed forward. In full-face view occipital margin weakly emarginate.

Occipital corners rounded. Lateral sides of head roundly convex and constricted at the antennal socket position. Clypeus with a depressed longitudinal central line, anterior margin straight. Mandibles long triangular and curved down at apex, masticatory margin with 13 peg-like teeth. Scape of antenna surpassed occipital corner by about 1/10 of its length, segments 4 ~ 10 about as broad as long. In profile view promesonotum higher than propodeum, mesothorax weakly constricted. Promesonotal suture distinct, metanotal groove shallowly depressed. Dorsum of propodeum straight and longer than declivity, posterodorsal corner rounded. In profile view petiolar node narrowed upward, anterior face straight, dorsal and posterior faces convex, anterodorsal corner roundly prominent and higher than posterodorsal corner, the latter rounded. Anteroventral corner of petiolar sternite bluntly extruded, with a circular subtransparent fovea. Postpetiolar node inclined forward, anterodorsal corner roundly prominent, sternite higher than long and inclined forward. In dorsal view both petiolar node and postpetiolar node transverse and broader than long, narrowed forward. First segment of gaster large, about 3/5 as long as gaster. Mandibles sparsely and finely punctured. Head, alitrunk, petiole, postpetiole and gaster smooth and shining. Head and body with sparse



Figs. 18 ~ 23 *Protanilla* workers

图 18 ~ 23 原细蚁属 *Protanilla* 工蚁

18 ~ 20: *P. concolor* sp. nov. (单色原细蚁, 新种); 21 ~ 23: *P. bicolor* sp. nov. (双色原细蚁, 新种);

18, 21: Head in full-face view (头部正面观); 19, 22: Body in profile view (整体侧面观);

21, 23: Body in dorsal view (身体背面观); Pilosity omitted (毛被省略)

suberect hairs and abundant decumbent pubescence. Scapes and tibiae with sparse erect hairs and dense pubescence. Body in color reddish brown. Mandibles and clypeus yellow. Antennae and legs light yellowish brown.

Holotype: worker, No. A98-993, 1 980 m, Peak of Nangongshan Mountain, Mengla County, Yunnan Province, collected from a soil sample of the mossy evergreen broad-leaf forest, 1998. III. 16 (XU Zhenghui).

This new species is close to *P. rafflesi* Taylor, but with body larger, head relatively broader, and scape comparatively shorter. It seems the new species nests in soil in the forest and lives in high altitude mountain areas.

***Protanilla bicolor* sp. nov.** (Figs. 21 ~ 23)

Holotype worker: TL 3.0, HL 0.53, HW 0.43, CI 81, SL 0.47, SI 108, PW 0.37, AL 0.87, PNL 0.24, PNW 0.19, PNH 0.30, PPNL 0.24, PPNW 0.21, PPNH 0.32. Head longer than broad, narrowed forward. In full-face view occipital margin shallowly emarginate, occipital corners roundly prominent. Lateral sides evenly convex, each side with a prominence near the antennal socket position. Clypeus longitudinally depressed, without a depressed longitudinal central line, anterior margin emarginate. Mandibles long triangular, curved down at apex, masticatory margin with 11 peg-like teeth. Antennae stout, apex of antennal scape just reached occipital corner, segments 4 ~ 10 broader than long. In profile view promesonotum higher than propodeum, mesothorax weakly constricted. Promesonotal suture distinct, metanotal groove shallowly depressed. Dorsum of propodeum straight, about 2 times as long as declivity, posterodorsal corner rounded. In profile view petiolar node narrowed upward, both anterior and posterior faces slope-like, dorsum convex, anterodorsal and posterodorsal corners rounded. Anteroventral corner of petiolar sternite bluntly extruded, with a circular subtransparent fovea. Postpetiolar node strongly inclined forward, anterodorsal corner roundly prominent, sternite longer than high. In dorsal view both petiolar node and postpetiolar node elliptic and longer than broad. First gastral segment large and about 3/5 as long as the gaster. Mandibles, head, alitrunk, petiole, postpetiole and gaster smooth and shining. Head and body with

sparse suberect hairs and dense subdecumbent pubescence. Scapes and tibiae with sparse suberect hairs and dense decumbent pubescence. Body in color brownish yellow, posterior portion of mesothorax, metathorax, propodeum, petiole, postpetiole and first gastral segment black.

Paratype workers: TL 2.7 ~ 3.0, HL 0.50 ~ 0.53, HW 0.42 ~ 0.45, CI 78 ~ 87, SL 0.43 ~ 0.47, SI 96 ~ 108, PW 0.33 ~ 0.38, AL 0.83 ~ 0.87, PNL 0.22 ~ 0.24, PNW 0.19 ~ 0.21, PNH 0.30 ~ 0.33, PPNL 0.24 ~ 0.26, PPNW 0.21 ~ 0.24, PPNH 0.32 ~ 0.35 ($n = 8$). As holotype.

Holotype: worker, No. A97-2240, 1 600 m, Papo Village, Meng' a Town, Menghai County, Yunnan Province, from a colony nesting in soil in deciduous broad-leaf forest, 1997. IX. 9 (XU Zhenghui). Paratypes: 22 workers, from the same colony as holotype and with the same data.

This new species is close to *P. rafflesi* Taylor, but with head relatively broader, and alitrunk comparatively longer. The new species constructs nest in soil in the forest in mountain areas. A colony including 23 workers was observed.

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中国细蚁亚科系统分类研究

(膜翅目: 蚁科)

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摘要: 记载中国细蚁亚科 Leptanillinae 昆虫 2 属。报道细蚁属 *Leptanilla* Emery 3 种: 湖南细蚁 *L. hunanensis* Tang, Li et Chen 分布于湖南省, 台湾细蚁 *L. taiwanensis* Ogata, Terayama et Masuko 分布于台湾省, 云南细蚁 *L. yunnanensis* sp. nov. 分布于云南省。原细蚁属 *Protanilla* Taylor 为中国新记录属, 在云南省采集并描述该属 2 新种: 单色原细蚁 *P. concolor* sp. nov. 和双色原细蚁 *P. bicolor* sp. nov.。编制了细蚁亚科这 2 属的工蚁分属检索表和中国分布种工蚁分种检索表。

关键词: 膜翅目; 蚁科; 细蚁亚科; 系统分类; 中国

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